

# FOOD AND FEEDING HABITS OF *LABEO GONIUS* (HAM.) FROM THE RIVER KALI<sup>1</sup>

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(With three figures)

*L. gonius* (Ham.) feeds mainly on phytoplanktonic organisms. Diatoms, green algae and decayed organic matter were the main food items present in the gut. The presence of sand and mud in the gut contents showed bottom feeding habits of the fish. The intensity of feeding was found to be maximum during post-monsoon and winter months (October-February) and low during post-winter and monsoon months (March-August). Maturation of gonads also adversely affected the feeding intensity in both the sexes. The fish showed a positive selection for all phytoplanktonic organisms.

## INTRODUCTION

An important aspect of the biology of fish is to determine its food and feeding habits. Food composition, intensity of feeding and its variations with season, size and sex of *Labeo gonius* are reported here.

## MATERIALS AND METHODS

Monthly samples were obtained for a period of 12 months, from January to December, 1974. The fishes were caught by gill net during the early hours of morning and brought to the laboratory in ice.

Each fish was measured upto nearest millimetre from the tip of the snout to the longest ray of caudal fin, weighed nearest to 0.1 gm and sexed. State of maturation was determined following the scheme of classification used for *Ophicephalus punctatus* (Qayyum & Qasim 1964a). The guts were taken out

carefully from the oesophagus to the last part of the intestine, weighed upto 0.5 gm and preserved in 10% formalin.

For the analysis of gut content of the fishes, the number method as described by Hynes (1950) was followed. As far as possible, various planktonic food items were identified upto generic level and counted. Their relative abundance was expressed as percentage of total number of food items in the sample. The percentages of decayed organic matter and sand and mud were decided by eye estimation.

The intensity of feeding was studied by determining the gastro-somatic index (gut weight expressed as percentage of body weight). The number of fishes with empty guts was also noted in each month and expressed as the percentage of total number of fishes examined in that month.

## RESULTS AND DISCUSSION

Absence of teeth, a narrow mouth, depressed buccal cavity, absence of tongue, modification of gill rakers for filtration, absence of stomach and presence of long gut indicated herbivorous feeding habit of this fish. The

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MONTHLY VARIATIONS IN THE PERCENTAGE COMPOSITION OF DIFFERENT FOOD ITEMS OF *Labeo gonius*

## FOOD AND FEEDING HABITS OF LABEO GONIUS

Food items	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
GREEN ALGAE	11.1	6.7	11.2	12.9	15.9	4.5	2.4	5.2	6.8	6.7	8.5	16.9	8.6
<i>Oedogonium</i>	0.6	0.2	0.9	0.4	0.1	—	0.6	—	—	0.2	0.3	0.5	0.5
<i>Pediastrum</i>	0.5	0.1	0.4	0.2	—	—	0.1	0.1	1.0	0.1	0.2	0.4	0.4
<i>Selenastrum</i>	—	—	0.2	—	—	0.1	—	1.3	0.2	0.3	—	0.7	0.5
<i>Antistrodesmus</i>	2.5	—	0.2	0.3	0.2	0.2	0.1	0.2	1.8	1.1	2.5	4.2	0.8
<i>Senedesmus</i>	1.2	—	0.2	6.9	5.2	1.7	0.9	1.6	2.5	2.1	4.2	5.1	2.0
<i>Spirogyra</i>	3.1	—	5.2	11.3	7.9	2.2	0.8	1.9	0.9	—	0.1	0.8	1.7
<i>Tetraspora</i>	—	5.2	—	—	—	—	—	—	0.1	—	1.2	2.1	0.5
<i>Crucigenia</i>	3.2	1.2	4.1	3.8	2.5	1.3	—	—	—	2.9	—	3.1	2.2
DIATOMS	34.1	21.3	30.1	15.1	5.4	1.7	6.6	9.9	24.0	27.4	32.1	43.4	18.6
<i>Cyclotella</i>	8.2	3.1	0.4	3.5	0.5	0.2	1.9	2.1	4.0	9.5	11.5	11.9	3.3
<i>Diatoma</i>	0.7	3.5	3.1	1.9	1.1	0.1	0.9	1.0	3.1	0.8	0.7	1.1	1.6
<i>Nitzschia</i>	1.3	1.1	1.7	1.5	0.8	0.2	1.8	2.6	2.1	6.2	5.2	4.1	2.2
<i>Navicula</i>	13.1	10.5	11.5	5.2	2.5	0.5	0.8	2.1	4.8	7.8	10.5	12.2	3.9
<i>Cymbella</i>	2.5	0.8	0.5	0.3	0.3	0.1	1.2	2.0	3.8	—	—	0.3	1.9
<i>Gyrodigma</i>	4.5	3.7	2.1	0.9	—	0.2	—	—	2.0	1.9	2.1	8.5	2.3
<i>Cocconeis</i>	3.8	0.5	10.2	0.9	0.2	—	—	—	0.9	1.2	1.8	3.1	1.6
<i>Synedra</i>	—	—	0.4	0.8	—	—	—	0.1	0.5	—	0.2	0.1	0.3
<i>Surirella</i>	—	2.1	0.2	—	—	—	—	—	2.8	—	0.1	0.1	1.5
BLUE GREEN ALGAE	0.4	0.6	0.2	1.6	1.0	—	7.2	4.2	7.7	2.5	2.3	0.3	5.2
<i>Nostoc</i>	—	0.2	—	0.1	—	—	0.9	0.1	0.8	0.3	0.2	0.1	0.5
<i>Anabaena</i>	—	—	0.2	—	—	—	—	—	1.5	—	1.1	—	0.8
<i>Microcystis</i>	—	0.3	—	0.4	0.2	—	3.8	2.0	2.5	—	—	0.2	2.1
<i>Phormidium</i>	0.4	0.1	—	1.1	0.8	—	2.5	2.1	1.9	2.2	1.1	—	1.8
DESMIDS	2.3	4.1	1.7	—	—	—	0.2	1.6	1.5	2.4	4.1	1.2	1.4
<i>Cosmarium</i>	0.2	1.3	1.5	—	—	—	0.2	0.3	0.6	—	—	—	0.3
<i>Closterium</i>	2.1	2.8	0.2	—	—	—	—	1.3	0.7	2.4	0.1	5.2	1.1
Volvox (PHYTO-FLAGELLATES)	0.4	—	—	—	—	—	—	—	0.1	—	0.1	—	0.1
ALGAL SPORES AND ZYGOTES	0.2	—	1.4	1.9	—	2.1	8.2	10.5	14.5	1.2	0.8	0.3	8.5
MACROVEGETATION	2.1	0.9	5.5	4.2	6.2	6.5	6.5	2.0	2.8	3.5	4.1	3.8	3.7
DECAYED ORGANIC MATTER	13.5	22.2	6.2	8.2	6.7	13.2	12.8	16.5	20.2	33.7	28.5	15.5	16.4
<i>Keratella</i> (ROTIFERS)	—	—	0.2	—	—	—	—	2.8	1.5	0.2	—	—	2.1
SAND AND MUD	35.9	45.2	48.5	56.1	64.8	72.0	56.1	47.3	20.9	22.4	19.5	18.6	35.4

analysis of gut contents of the fish for consecutive months showed that the fish mainly feeds on small phytoplankton and decayed organic matter.

### Food composition

Seasonal variation in the composition of gut contents of *L. goni* becomes quite apparent from Table 1. Phytoplankton was found to be the main food of the adult fish. It formed about 45% of the total food consumed.

#### Diatoms (Bacillariophyceae)

The diatoms were represented by 9 genera which formed the chief food of the fish and constituted about 18.6% of the total food. This group was more abundant in the food items encountered during October to March and comparatively lesser percentage occurred from April to August. The percentage of diatoms was very low in June. *Navicula*, *Cyclotella*, *Nitzschia*, *Gyrosigma*, *Cymbella* and *Diatoma* were the most important diatoms

and occurred in decreasing order. From September to April, *Navicula* was encountered abundantly while from May to August it was extremely scarce. *Nitzschia* was commonly found throughout the year except during May, June and July (Table 1).

#### Green algae (Chlorophyceae)

In *L. goni* diet green algae were represented by 8 genera, they constituted about 8.6% of the total food and occurred throughout the year in the gut content. They were more abundant during January, March, April, May and December and less abundant in July. The most important genera were *Scenedesmus*, *Ankistrodesmus*, *Crucigenia* and *Tetraspora*. The less important genera were *Oedogonium*, *Pediastrum*, *Selenastrum* and *Spirogyra* (Table 1).

#### Blue green algae (Myxophyceae)

This group, comprising of *Nostoc*, *Anabaena*, *Microcystis* and *Phormidium*, formed 5.2% of the total food. *Microcystis* and

TABLE 2

VARIATIONS IN THE FOOD COMPOSITION OF *Labeo goni* IN RELATION TO SIZE

FOOD ITEMS	SIZE GROUPS				
	II	III	IV	V	VI
	(201-250)	(251-300)	(301-350)	(351-400)	(401-450)
Green Algae	16.7	10.1	10.4	8.7	10.2
Diatoms	29.5	31.3	31.4	8.6	3.7
Blue Green Algae	0.4	1.2	0.9	1.6	1.0
Desmids	1.2	2.5	2.5	—	—
Phytoflagellates	0.3	0.3	1.2	2.1	2.2
Algal spores & zygotes	1.7	0.7	1.4	1.9	—
Macrovegetation	3.9	2.5	2.4	5.3	6.4
Decayed organic matter	14.5	19.7	19.9	10.7	10.5
Rotifers	—	0.2	0.2	—	—
Sand and mud	31.8	31.5	29.7	61.1	66.0

The percentage of food items in the gut contents of the fishes of size group I (150-200) could not be studied as the specimens of this size group were not available in sufficient number.

*Phormidium* were more common. Myxophyceae was predominant in July and September.

#### Other food items

Desmids, phytoflagellates, algal spores and zygotes and macrovegetation were also encountered in the guts of *L. gonius* (Table 1). These items together formed 13.7% of the total food. Zooplankton occurred in very small quantities and appear to have accidentally entered along with phytoplankton.

#### Decayed organic matter

This group mainly consisted of unidentifiable plant matter in decayed condition and constituted about 16.4% of the total food. It occurred regularly in the gut throughout the year.

#### Sand and mud

It formed 35.4% of the total food and occurred in the gut throughout the year and constituted the main bulk of the gut contents (Table 1).

A gradual increase in the percentage of phytoplankton along with sand and mud in the gut contents with increase in size of the fish reveals that this species changes its feeding habit as it grows (Table 2, Fig. 1). The occurrence of large quantities of decayed organic matter together with sand and mud in the gut indicates that the fish feeds at the bottom.

No difference was noted in food composition of males and females.

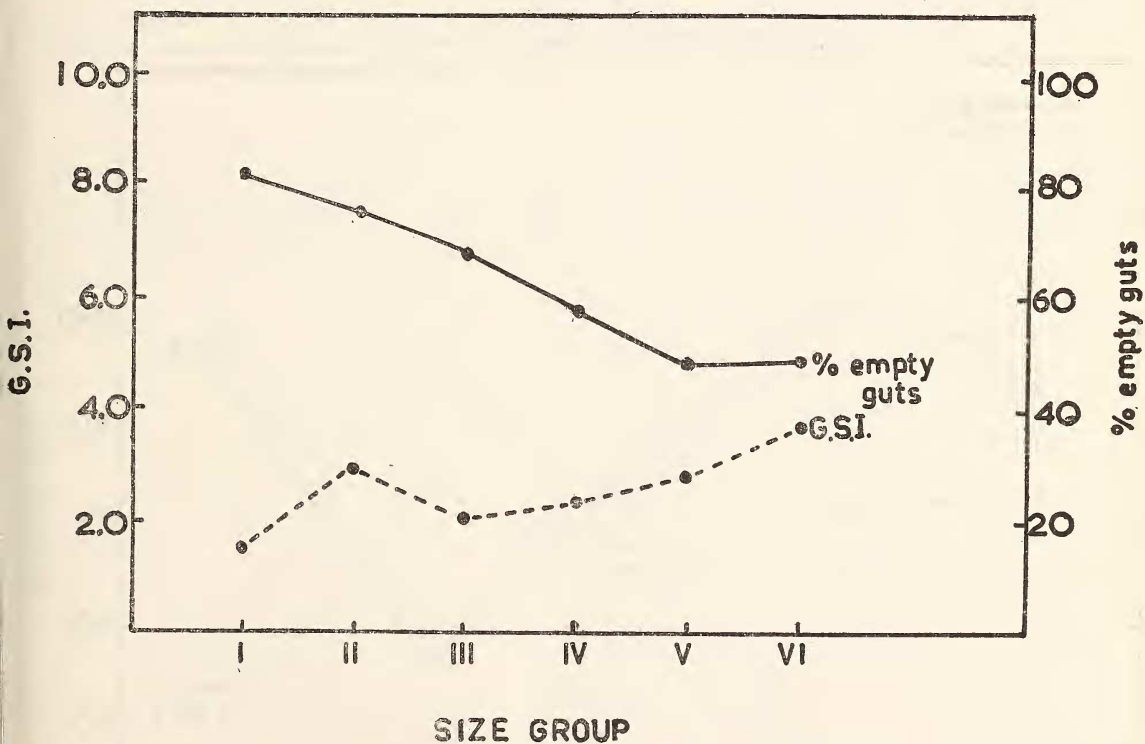


Fig. 1. Intensity of feeding at different size groups of *L. gonius*.

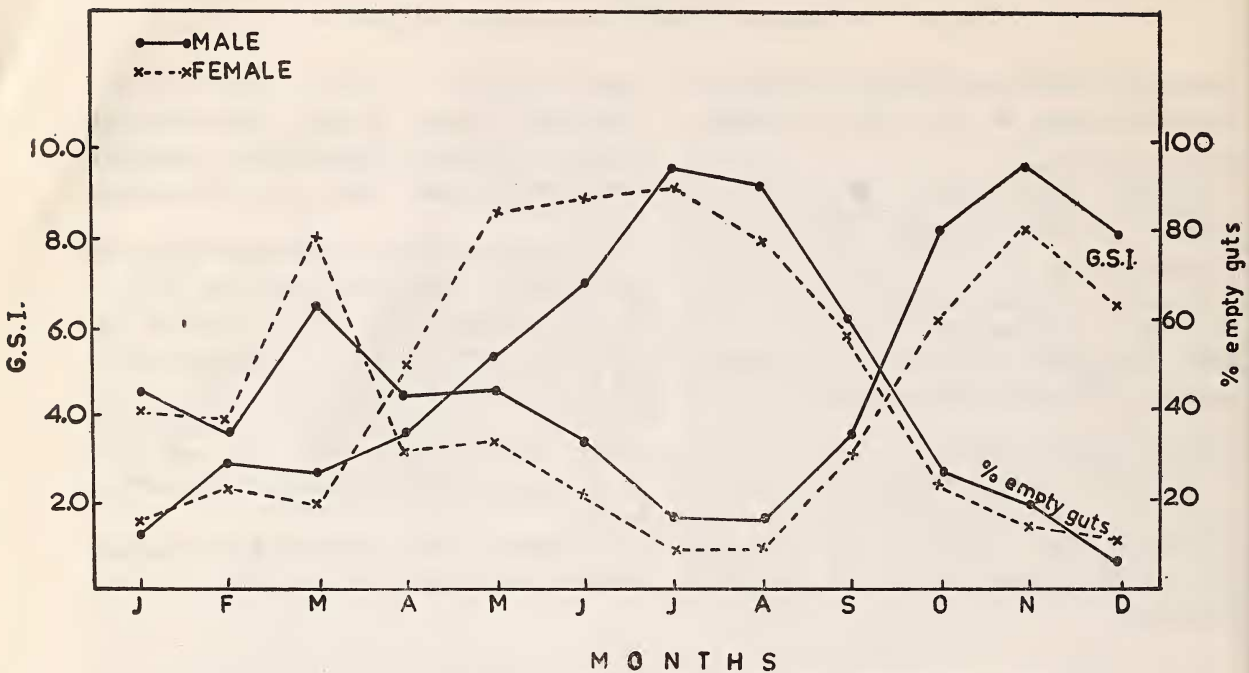


Fig. 2. Seasonal variation in the intensity of feeding of *L. gonius*.

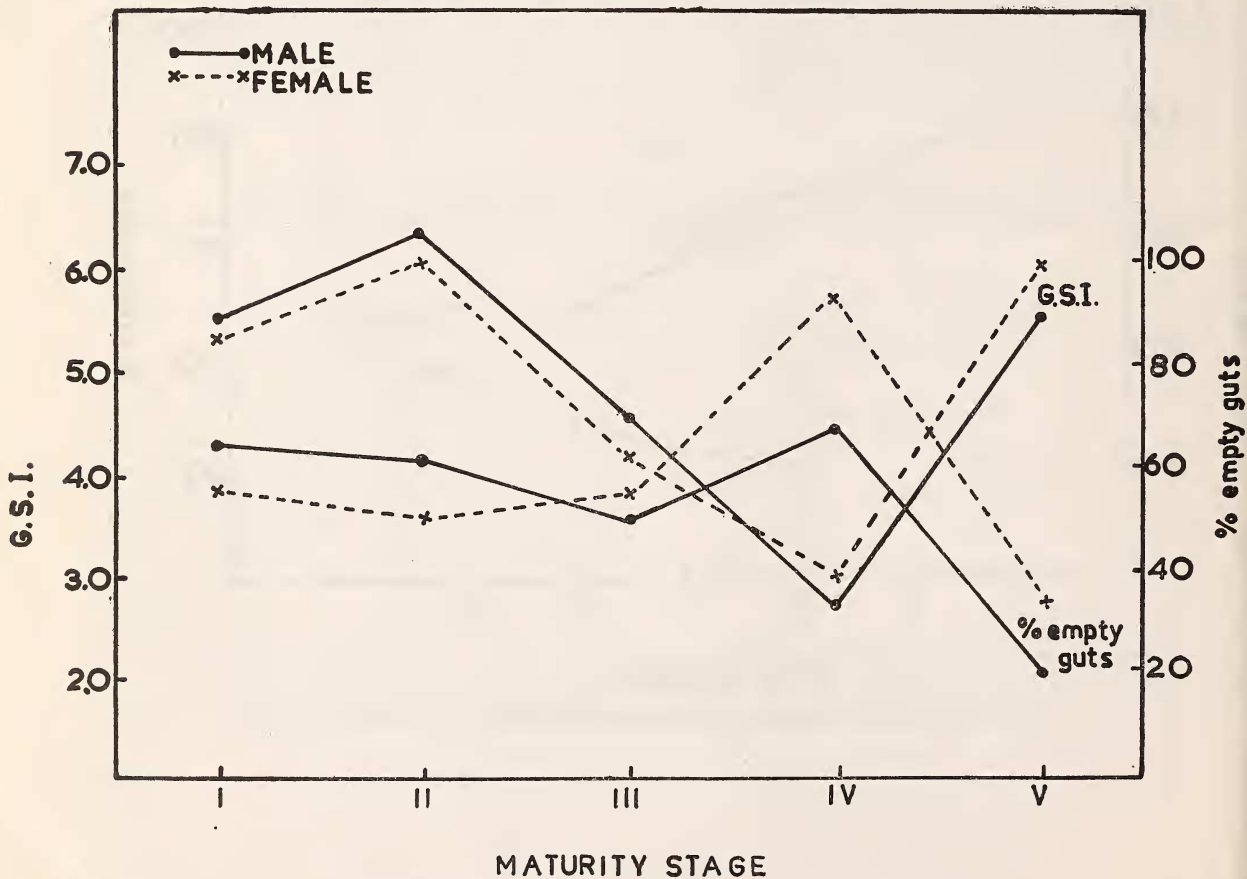


Fig. 3. Intensity of feeding at different maturity stages of *L. gonius*.



*Intensity of feeding*

The values of gastro-somatic index along with the percentage of empty guts for different months are given in Fig. 2. A pronounced feeding activity was recorded from October to March. The feeding intensity was extremely low during July and August.

In both the sexes the intensity of feeding was high in immature, maturing and spent fishes and low in ripening and ripe fishes. The feeding intensity was found to be better in males than in females throughout the year, especially in the spent fishes (Fig. 3).

The relative percentage of different food items varied from month to month and a particular type of food item tended to be maximum at a particular time, perhaps due to its abundance in the environment at that time. There appears to be a definite preference for particular species or genus of phytoplankton.

Generally the small sized phytoplankton and decayed organic matter were preferred.

Seasonal variation in the rate of feeding appears to be affected by temperature and flooding of the river as low food intake was recorded during monsoon months (June, July and August) and high rate of feeding during rest of the months. The feeding intensity was also influenced by the state of maturation of gonads.

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